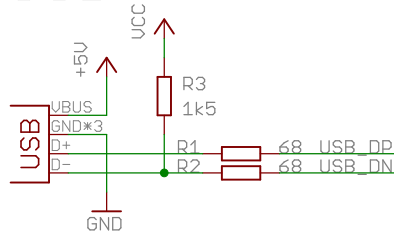
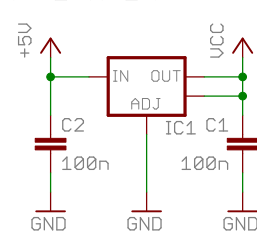


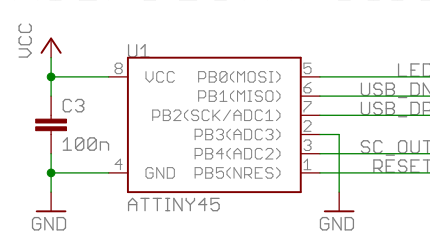
USB



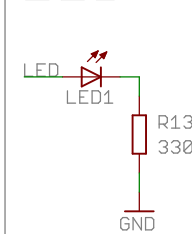
Power



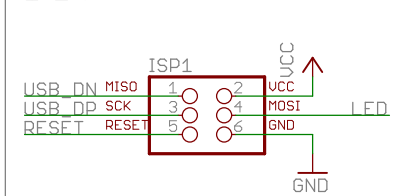
Microcontroller



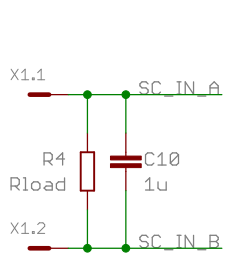
LED



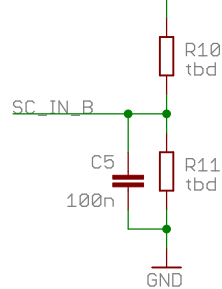
ISP



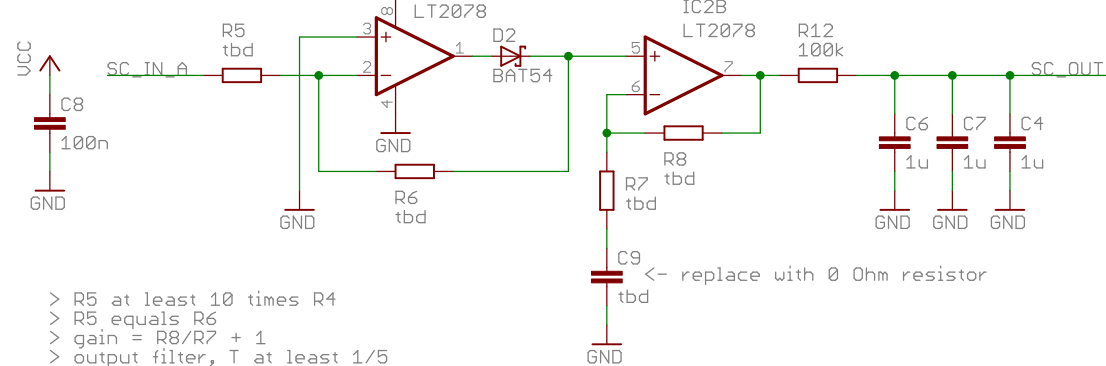
SC In



Bias



Rectifier



Input coil: CTSA010-20
Vout = .333 V for I = 20 A

$P_{max} = 3300 \times 1.2 \approx 4000 \text{ W}$
 $I_{rms} = P_{max} / 230 = 17.4 \text{ A}$
 $I_{pk} = I_{rms} \times \sqrt{2} = 24.6 \text{ A}$
 $V_{pk} = .333 / 20 \times I_{pk} = .410 \text{ V}$
 $V_{avg} = V_{pk} \times 2 / \pi = .261 \text{ V}$

Gain = $3.3 / 1 + 1 = 4.3$
 $V_{pk_post} = V_{pk} \times \text{Gain} = 1.76 \text{ V}$
 $V_{avg_post} = V_{avg} \times \text{Gain} = 1.121 \text{ V}$

Tfilter = $100k \times 3u = .3 \text{ s} = 3.33 \text{ Hz}$

$V_{avg} = .333 / 20 \times (P / 230 \times \sqrt{2}) \times 2 / \pi \times 7.8$
 $P = V_{avg} / 7.8 \times \pi / 2 / \sqrt{2} \times 20 / .333 \times 230$

$P_{max} = 6500 \text{ W}$
 $I_{rms} = P_{max} / 230 = 28.2 \text{ A}$
 $I_{pk} = I_{rms} \times \sqrt{2} = 40.0 \text{ A}$
 $V_{pk} = .333 / 20 \times I_{pk} = .665 \text{ V}$
 $V_{avg} = V_{pk} \times 2 / \pi = .424 \text{ V}$

Gain = $1.5 / 1 + 1 = 2.5$
 $V_{pk_post} = V_{pk} \times \text{Gain} = 1.664 \text{ V}$
 $V_{avg_post} = V_{avg} \times \text{Gain} = 1.060 \text{ V}$

RMS for sine wave

$V_{avg} = V_{pk} \times 2 / \pi$
 $V_{rms} = V_{pk} / \sqrt{2}$



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TITLE: usb-current-meter

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